

REMARKS

Applicants appreciate the Examiner's thorough examination of the subject application and request reconsideration of the subject application based on the foregoing amendments and the following remarks.

Claims 1-12 are pending in the subject application.

Claims 1-4 and 7-12 stand rejected under 35 U.S.C. §102 and/ or 35 U.S.C. §103.

Claims 5-6 were objected to as depending from a rejected base claim, however, the Examiner indicated that these claims would be allowable if appropriately re-written in independent form.

Claims 5-6 were canceled in the foregoing amendment, but were represented in independent form, as suggested by the Examiner, as added claims 13 and 14 respectively.

Claims 1, 4 and 9 were amended to clarify that the image being generated is that of the target object.

Claim 7 was amended to more clearly indicate that the automatically selecting function is carried out responsive to the result of the image categorization.

Claims 15-18 were added to claim embodiments/ aspects of the present invention.

The amendments to the claims are supported by the originally filed disclosure.

35 U.S.C. §102 REJECTIONS

The Examiner rejected claims 1, 2, 4 and 7-12 under 35 U.S.C. §102(e) as being anticipated by Lawton et al. [USP 5,990,901; "Lawton"]. Applicants respectfully traverse as discussed below. Because claims were amended in the instant amendment, the following

discussion refers to the language of the amended claims. However, only those amended features specifically relied upon to distinguish the claimed invention from the cited prior art shall be considered as being made to overcome the cited reference.

Claim 1

Applicants claim, claim 1, an image processing device for generating a 3-D model image of a target object included in an input image that includes a face image input means for inputting a face image, a 3-D model input means for inputting one or a plurality of 3-D models for each of a plurality of parts, a 3-D model selection means for selecting a 3-D model for an arbitrary part of the plurality of parts based on an instruction input by an operator, a face image mapping means for mapping the face image input via the face image input means to the 3-D model selected by the 3-D model selection means and for displaying the mapped 3-D model, and an image generation means for generating a 3-D still image of the target object using the 3-D model selected by the 3-D model selection means and the face image input by the face image input means.

As indicated in the subject application (*e.g.*, see pages 17 and 19 thereof), after the images are selected image generation may be performed based on the 3-D models of all parts and the resulting image may be displayed. The subject application also indicates that there are known techniques such a texture mapping and 3-D rendering for the mapping of face image to a 3-D model, however, it is clear from the discussion in the subject application that such mapping is not the only feature of the present invention.

In contrast to the present invention, Lawton describes a system and method is described for automatically editing digital images. In Lawton, the image to be edited is selected and registered with a model that is an abstract of features and attributes common to a category of images to which the selected image belongs. As to the models referred to in Lawton, Lawton specifically notes that "In keeping with the invention, the models are not themselves high quality images. To the contrary, the models can be quite abstract and cartoon-like because they are only used for recognition and directing the application of editing effects." See col. 6, lines 27-31 thereof. Lawton also indicates that many other images of objects also may be edited using the techniques of the invention, as long as a general class of objects to which an image belongs is amenable to being represented by a model comprising a set of common features or attributes. After the appropriate model is selected in Lawton, the user is prompted to register the details of the selected image with the generalized features and attributes of the selected model. Editing processes or tools, which are linked to the model, are then automatically applied to the image in order to perform a desired editing function. In addition to applying editing techniques to existing images in a larger image, Lawton provides that that invention enables a user to paste and blend images into another, larger image (*e.g.*, create a morphing effect by pasting one persons head over the head of another in an original image). See also the Abstract of Lawton.

As to the registering of the model with an object in an image, Lawton provides that (see col. 2, lines 33-46):

To register a model with an object in an image, the user first selects the view corresponding to a two dimensional model. This can be done in two different ways:

either with through direct manipulation of a 3D model until it is at the same orientation as the object and a corresponding 2D model is generated or by selecting from a set of different views. Once the model orientation has been selected, a process is initiated for prompting a user to locate attributes in the object that match the attributes in the model. In the model, the attributes to be directly registered with the object in the original image are represented by nodes that define distinct points along a boundary, such as discontinuities and local maxima of curvature.

Once the nodes are mapped to locations in the original image, the attributes are warped to the size and orientation of the object reflected by the spatial placement of the nodes in the image and the internal constraints in the model. Also, the number and type of nodes may be dynamically determined to match the expected detail in the image based on the approximate size of the object to be edited, which can be estimated from the spatial separation of the locations in the original image mapped to the first few nodes.

Once the attributes of the model are registered with the like attributes of the object to be edited, one or more editing processes linked to the model are automatically applied to the object in order to create an edited image without any further input from the user. Since the application of the editing effect by the editing tool is constrained by the attributes of the model, the editing of the object and surrounding areas of the original image is controlled by the mapping of the attributes of the model to locations in the original image containing the object.

As also indicated in Lawton, after the editing tool or tools 58 are automatically executed resulting in an edited image 68, the edited image resides in the video display memory 42a. The edited image is used to update the frame buffer so that the edited image is displayed to the user. If

the edited image 68 displays the effect desired by the user in making the edits, the edited image can be then saved as a new image or it can replace the original image 66. See col. 7, lines 20-29.

Also, the image generation means of claim 1 generates a 3-D still image of the target object using the 3-D model selection means the face image input by the face image means. This feature has the advantage of enabling the production of a 3-D model of a whole body (see subject application page 54, lines 15-20). Such a feature is not taught nor suggested by Lawton. Moreover, the Office Actions does not include any assertions or specific references to Lawton as to how Lawton supposedly describes or corresponds to the 3-D still image.

Further, Lawton does not teach nor suggest generating a 3-D image using a selected 3-D model and a face image. This clear from figures 13A and 13B of Lawton that show the construction of a final 2-D image. Lawton describes mapping points on a 2-D image to a 3-D model (see Lawton, column 7, lines 43-51). This, however, is done to facilitate manipulation of the image. The final image in Lawton is 2-D, see for example Lawton column 8, lines 64. The 3-D model in Lawton is used for morphing between faces mapped to the same model to avoid tedious pixel-to-pixel matching and the morphing is carried out in the original image. The original image, however, is 2-D; only the face is mapped to a 3-D model. Thus, it is clear that the final image is a 2-D image, and the 3-D model is merely used as a tool to manipulate the 2-D image. Thus, Lawton does not describe, teach or suggest generating a 3-D still image.

In sum, Lawton describes a technique for editing digital images. Lawton nowhere describes a device not a methodology as are claimed by Applicants by which a 3-D image can be generated using the 3-D model selected by the 3-D model selection means and the face image input by the

face image input means. This is not surprising as the invention in Lawton is directed to methods and devices for the editing of digital images, not conversion of these images into 3-D images, still or moving.

As such, Applicants submit that the invention of claim 1 is distinguishable from Lawton for the foregoing reasons.

Claim 4

As to claim 4, this claim adds the further limitation that when the 3-D model selection means changes a 3-D model of a first part, the 3-D model selection means changes a 3-D model of a second part to a 3-D model of a second part that is in association with the changed 3-D model of the first part. The discussion in Lawton referred to in the Office Action, which also refers to Fig. 3, describes the editing process that proceeds from an initial step 101 of selecting an editing effect to be executed on an object in the original image 66 through a series of user interface prompts that direct the user to select the appropriate one of the models 62 and one of its two-dimensional projections 64, which is then used as a map to automatically apply an editing tool to the object. This discussion also indicates that the user interface displays a menu of alternative editing techniques that can be applied through one of the models 62 in the library 56. In response to the user selecting a desired editing technique, the user interface presents at step 103 a representation the three-dimensional model associated with the selected editing effect. The representation includes a mechanism to prompt the user to select the two-dimensional projection 64 or the three-dimensional model that best matches the orientation of the object to be edited in the original image 66. The user

interface may include a prompt for requesting detailed attributes of the object to be edited that can be taken into consideration by appropriate tailoring of the two-dimensional attributes 64 of the selected model 62. For example, the user interface may query the user about specific facial attributes if a head is the selected three-dimensional model 62--*e.g.*, adding glasses or a beard to the model. It can hardly be said that the foregoing describes a device, or a related method, whereby the 3-D selection means changes a 3-D model of a second part to a 3-D model of a second part that is in association with a changed 3-D model of the first part, when the 3-D model selection means changes a 3-D model of a first part. Applicants also submit that Lawton does not specifically describe in detail anywhere, a process for editing digital images where the images are composed of a plurality of parts and where a 3-D model is specified for each of such parts. Applicants would further note that Lawton nowhere includes a discussion, like that found for example on pages 20-22 of the subject application that relates to the process embodied in claim 4.

As such, Applicants submit that the invention of claim 4 is distinguishable from Lawton for the reasons above regarding claim 1 as well as the additional reasons provided above.

Claim 7

As to claim 7, this claim adds the further limitations that the image processing device further includes a face image categorization means for categorizing a face image input via the face image input means, and a face model selection means for automatically selecting a 3-D model of a part corresponding to a face responsive to a result of the categorization by the face image categorization means. Also, the face image mapping means maps the face image input via the face

image input means to the 3-D model of the part corresponding to a face selected via the face model selection means.

The discussion in Lawton referred to in the Office Action for the rejection of this claim, is directed to the editing process and the displayed user interface prompts utilized by that invention in connection with the described editing process. Lawton nowhere includes a discussion, like that found for example on pages 23-36 of the subject application. As indicated herein, Lawton describes a process by which an image is registered to a generic model such that editing process can be executed because of such registration. Lawton nowhere describes a process by which the face image that is inputted is categorized by a face image categorization means and a result of this face image categorization is used by the face model selection means to automatically select a 3-D model and mapping the face image input to the automatically selected 3-D model. The process described in Lawton involving selection of the 2-D or 3-D models clearly involves the action by the user. Moreover, the process described in Lawton for this is not easily amenable to being adapted for an automatic processing function. In sum, Lawton nowhere describes a device of claim 7 having the function disclosed and taught by Applicants.

As such, Applicants submit that the invention of claim 7 is distinguishable from Lawton for the reasons above regarding claim 1 as well as the additional reasons provided above.

Claims 8-12

As to claim 8, Applicants respectfully submit that the foregoing remarks that are directed to claims 1 and 7 at least apply to distinguish the image processing device of claim 8 from Lawton.

As to claim 9, Applicants respectfully submit that the foregoing remarks that are directed to claim 1 at least apply to distinguish the image processing method of claim 9 from Lawton.

As to claim 10, Applicants respectfully submit that the foregoing remarks that are directed to claims 1 and 7 at least apply to distinguish the image processing method of claim 10 from Lawton.

As to claim 11, Applicants respectfully submit that the foregoing remarks that are directed to claim 1 at least apply to distinguish the computer-readable recording medium storing an image processing program for generating a 3-D model image of a target object included in an input image of claim 11 from Lawton.

As to claim 10, Applicants respectfully submit that the foregoing remarks that are directed to claims 1 and 7 at least apply to distinguish the computer-readable recording medium storing an image processing program for generating a 3-D model image of a target object included in an input image of claim 12 from Lawton.

As provided in MPEP-2131, a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegel Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Or stated another way, “The identical invention must be shown in as complete detail as is contained in the ... claims. *Richardson v Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ 2d. 1913, 1920 (Fed. Cir. 1989). Although identify of terminology is not required, the elements must be arranged as required by the

claim. *In re Bond*, 15 USPQ2d 1566 (Fed. Cir. 1990). It is clear from the foregoing remarks that the above identified claims are not anticipated by the cited reference.

In deciding the issue of anticipation, the trier of fact must identify the elements of the claims, determine their meaning in light of the specification and prosecution history, and identify *corresponding elements* disclosed in the allegedly anticipating reference (emphasis added, citations in support omitted). *Lindemann Maschinenfabrik GMBH v. American Hoist and Derrick Company et al.*, 730 F. 2d 1452, 221 USPQ 481,485 (Fed. Cir. 1984). In concluding that the '770 Patent did not anticipate the claims, the Federal Circuit in *Lindemann Maschinenfabrik GMBH v. American Hoist and Derrick Company et al.*, at 221 USPQ 485-486, further provides that:

The '770 patent discloses an entirely different device,
composed of parts distinct from those of the claimed invention, and
operating in a different way to process different materials differently.
Thus, there is no possible question of anticipation by equivalents.
Citations omitted.

It is clear from the foregoing remarks, that the allegedly corresponding elements disclosed in Lawton do not in fact correspond to the elements of the claimed invention. It also is clear that the apparatus described in Lawton functions and operates in a different manner from that of the claimed invention. As also indicated above, the method disclosed and taught in Lawton for automatically editing digital images is completely different from the image processing methodology of the present invention, particularly image processing method for generating a 3-D model image of

a target object, and as claimed and taught by Applicants. Thus, there can be no disclosure or teaching in Lawton of Applicants' invention.

It is respectfully submitted that for the foregoing reasons, claims 1, 2 4, and 7-12 are patentable over the cited reference and thus, satisfy the requirements of 35 U.S.C. §102(e). As such, these claims, including the claims dependent therefrom are allowable.

35 U.S.C. §103 REJECTIONS

Claim 3 stands rejected under 35 U.S.C. §103 as being unpatentable over Lawton et al. [USP 5,990,901; "Lawton"] in view of Murata et al. [USP 5,867,171; "Murata"]. Applicants respectfully traverse(s) as discussed below. Because claims were amended in the instant amendment, the following discussion refers to the language of the amended claims. However, only those amended features specifically relied upon to distinguish the claimed invention from the cited prior art shall be considered as being made to overcome the cited reference.

Claim 3 depends from claim 1. As indicated herein Lawton does not disclose the image processing device of claim 1. Applicants also respectfully submit that Lawton does not provide any teaching, suggestion nor offer any motivation for modifying the devices and methods disclosed therein so as to yield the image processing device of claim 1. As such, and at least because of its dependency from a claim that is believed to be allowable, claim 3 also is considered to be in allowable form.

As to the secondary reference, Murata, this reference is being used for the limited of teaching that the plurality of parts can include a part for corresponding to the trunk, a part

corresponding to head and a part corresponding to the face. More particularly, Murata is directed to a face image processing device that processes data on a face image to create face images suitable for an age and presumes the age of the created face image on the basis of same. As such, the teachings alluded to in Murata do not overcome the shortcomings in the primary reference not provide any motivation for modifying the device disclosed in Lawton so as to yield the device as set forth in claim 1 or claim 3 as well as not providing any indication that the modification would be reasonably successful. This is not surprising, as Murata does not describe 3-D images at all. See the Abstract of Murata, for example, which describes outputting an image (2-D) along with a presumed age.

As provided in MPEP 2143.01, obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F. 2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F. 2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). As provided above, the references cited, alone or in combination, include no such teaching, suggestion or motivation.

Furthermore, and as provided in MPEP 2143.02, a prior art reference can be combined or modified to reject claims as obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Additionally, it also has been held that if the proposed modification or combination would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to

render the claims *prima facie* obvious. Further, and as provided in MPEP-2143, the teaching or suggestion to make the claimed combination and the reasonable suggestion of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). As can be seen from the forgoing discussion regarding the disclosures of the cited references, there is no reasonable expectation of success provided in the reference. Also, it is clear from the foregoing discussion that the modification suggested by the Examiner would change the principle of operation of the device disclosed in Lawton.

It is respectfully submitted that for the foregoing reasons, claim 3 is patentable over the cited reference(s) and thus, satisfies the requirements of 35 U.S.C. §103. As such, this claim is allowable.

CLAIMS 15-17

As indicated above, claims 15-17 were added to more distinctly claim embodiments/aspects of the present invention. These claims are clearly supported by the originally filed disclosure, including the originally filed claims. It also is respectfully submitted that these added claims are patentable over the cited prior art on which the above-described rejection(s) are based.

CLAIMS 5-6

In the above-referenced Office Action, claims 5 and 6 were objected to as being dependent upon a rejected base claim. It also was provided in the above-referenced Office Action, however,

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that these claims would be allowable if rewritten in independent form to include all the limitations of the base claim and any intervening claim(s).

Claims 5 and 6 were not expressly re-written in independent form as suggested by the Examiner, rather each of claims 5 and 6 were canceled and represented in independent form as added claims 13 and 14 respectively. Each of added claims 13 and 14 were written so as to include all the limitations of the base claim (claim 1) and the intervening claim (claim 4) and the limitations of claim 5 or 6 respectively. Accordingly, added claims 13 and 14 are considered to be in allowable form.

It is respectfully submitted that the subject application is in a condition for allowance. Early and favorable action is requested.


Because the total number of claims and/or the total number of independent claims post amendment now exceed the highest number previously paid for, a check is enclosed herewith for the required additional fees. However, if for any reason a fee is required, a fee paid is inadequate

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or credit is owed for any excess fee paid, the Commissioner is hereby authorized and requested to
charge Deposit Account No. **04-1105**.

Respectfully submitted,
Edwards & Angell, LLP

Date: June 24, 2004

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